IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of:	) MMB Docket No.: 1776-0013
	)
Inventor: Steven D. Bush	) Xerox Docket No.: D/A1346-US-NP
	)
Application No.: 10/759,970	) Examiner: David P. Turocy
	)
Filed: January 16, 2004	) Group Art Unit.: 1792
	)
Title: **DIP COATING PROCESS USING VISCOSITY TO CONTROL COATING THICKNESS**	) Confirmation No.: 8323
	)
	)

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PRE-APPEAL BRIEF REQUEST FOR REVIEW

Sir:

Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request. This request is being filed with a Notice of Appeal. The review is requested for the reasons stated on the attached sheets. This paper is filed by the Attorney of Record.

REMARKS

I. Reasons for Review

The Examiner has failed to make findings of fact that are properly supported by the cited Pinsley reference and has not given an adequate basis for one of ordinary skill in the art leaping over the differences between the prior art and the claimed invention to arrive at the claimed invention. Consequently, no *prima facie* case of obviousness has been made by the Examiner. The clear error in the Examiner's rejection centers on a finding of fact regarding the Pinsly reference and the extrapolation the Examiner makes from Cai to the obviousness conclusion.

> Finding of Fact: Pinsly is cited as a teaching that it is known in the art that variations in coating thickness are directly linked to the variations in the viscosity of the coating solution. *Office Action*, page 4, lines 2-4.

This finding of fact is not supported by the cited Pinsly reference and, consequently, no *prima facie* case of obviousness has been made.

A. Discussion of the Finding of Fact

The Examiner's citation of Pinsly for the teaching quoted above is an extension of Pinsly's disclosure based on Applicant's specification. Pinsly is addressing the problem of streaks occurring in a coating because the viscosity of a coating solution reaches a threshold where streaks appear in the coating. *Pinsly*, col. 6, lines 45-54. Streaks are described as being axial or circumferential non-uniformities. *Pinsly*, col. 1, lines 56-67. These non-uniformities appear to be irregular distributions of the particulate photoconductive material, not thickness variations. By keeping the viscosity of a coating solution between an initial viscosity level and a maximum level that is less than the threshold level, the coating does not develop streaks. *Pinsly*, col. 6, line 55 to col. 8, line 10. Thus, Pinsly does not teach that variations in coating *thickness* are directly related to variations in viscosity and, therefore, the finding of fact based on Pinsly is wrong. Instead, Pinsly teaches that the appearance of axial and circumferential streaks is directly related to viscosity reaching a threshold level. By operating a coating

process within a predetermined viscosity range streaking is prevented. With regard to coating thickness, Pinsly unequivocally teaches that coating solution flow rate changes cause coating material thickness variations, that these variations are undesirable, and that the flow rate of coating solution should be substantially constant. *Pinsly*, col. 2, lines 5-15; col. 10, lines 14-21. Thus, Pinsly discloses that streaks are addressed by keeping coating solution viscosity in a predetermined range below the threshold, *and* that coating thickness variations and the undesirable effects of such variations are prevented by keeping coating solution flow rate constant. Consequently, Pinsly teaches away from any useful purpose for variations in coating solution speed.

B. Discussion of the Cai Reference

With regard to Cai, the Examiner's comment regarding the relationship between coating thickness and the viscosity and speed of the coating solution appears to be made with reference to the formula disclosed in Cai at col. 4, line 35, which is a well known formula in the art. *Cai*, col. 3, lines 39-48. That formula, according to Cai, may be used to determine a coating speed once a wet coating thickness is selected, a proportionality constant empirically determined for the coating solution and selected wet coating thickness, and the viscosity, density, and surface tension have been measured for a particular coating scenario. *Cai*, col. 4, lines 7-43.

With these preliminary process conditions determined, Cai selects a gap size between the substrate being coated and the wall along which the coating solution flows. This gap must enable the coating solution to remain at a stress shear that is greater than a yield stress. *Cai*, col. 3, lines 34-41. The gap is selected with additional calculations made for the coating scenario conditions determined from the equation noted above. *Cai*, col. 4, line 53 to col 5, line 38. Determining whether a solution is thixotropic or non-thixotropic is also important as this property affects the stability of the yield stress level. *Cai*, col. 2, line 44 to col. 3, line 33. Once the proper gap for a set of particular process parameters has been selected, the process may be performed in accordance with those parameters without substantial risks of adverse effects. Cai states the purpose of the disclosure succinctly when he says, "Thus, by selecting

the appropriate gap distance *for a given set of dip coating parameters*, the present invention ensures a sufficient shear rate that breaks up flocculates, minimizes vortices and stagnation areas in solutions during the coating process, especially unstable (in the rheological sense), non-Newtonian solutions." *Cai*, col. 8, lines 40-45 (emphasis added).

Cai discloses no process for adjusting or compensating for changes to parameter values occurring during the process. Cai does disclose that once a coating speed has been determined for a particular set of parameters, the determined coating speed may be varied to alter the thickness of the coating. *Cai*, col. 4, lines 49-53. No corresponding change in viscosity is disclosed in this section so Cai is not teaching that coating solution speed changes are related to viscosity changes or *vice versa*. Instead, Cai is only teaching that if all other process parameters remain the same, speed can be varied to alter coating thickness. Consequently, the Examiner's conclusion (*Office Action*, p. 4, lines 5-12) that modification of pumping speed or viscosity in response to a change in the other characteristic (viscosity or speed, respectively) to achieve desired results is not supported by the references. Specifically, Pinsly teaches that streaking can be avoided by monitoring viscosity of a coating solution and restoring the viscosity to an initial level in response to the viscosity reaching a predetermined maximum. Cai teaches that selection of a gap distance for a given set of process parameters (speed and viscosity among the parameters) helps maintain coating level uniformity. Nothing in either of these references teaches or suggests the monitoring of one coating characteristic and adjusting another coating characteristic to compensate for a change in the first coating characteristic.

Only one source of information can make the Examiner's leap from the formula of Cai to the invention set forth in Applicant's claims. That source is the Applicant's specification. That source, however, is not available to the Examiner. Consequently, the section 103 ground of rejection is unsupported and must fall.

II. Conclusion

For all of the foregoing reasons, Applicant respectfully submits that the Examiner's conclusion that the Pinsly and Cai references suggest the monitoring of one coating

characteristic and adjusting another coating characteristic to compensate for a change in the first coating characteristic is unsupported unless the Examine uses Applicant's specification. Therefore, the final office action should be withdrawn. Favorable reconsideration and allowance of this application is, therefore, earnestly solicited.

Respectfully Submitted,

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